

tangent to the path, becomes a measure of the time of flight, according to the usual law of falling bodies; and the mean horizontal velocity being thus known for a series of different ranges, we can calculate the mean velocity for every 100 yards of a long range, and thence determine the resistance.

The author commenced his calculations from an assumed velocity of 1360 feet per second, in accordance with the results obtained at short ranges, and assumed for trial a resistance varying as the square of the velocity, but found that this law did not fit the results at all. A resistance varying as the cube of the velocity was then tried, and found very nearly to agree with the results of observation; and the agreement became, we may say, perfect, when the assumed initial velocity was slightly corrected.

As the calculations and experiments were all made without any notion of the resulting law, and without any knowledge of the work already done by Professor Hélie and Professor Bashforth, they afford a remarkable confirmation of the results obtained by those gentlemen. This is the more worthy of notice, as their data belong to pieces of large calibre, and the author's to small arms.

IV. "Remarks on the Great Nebula in Orion." In a Letter addressed to Prof. G. G. STOKES, Sec. R.S. By W. LASSELL, F.R.S. Received February 28, 1868.

I have been so much interested by the perusal of Lord Oxmantown's observations and drawing of the Great Nebula in Orion, published in the present volume of the 'Transactions,' that I venture to offer you a few remarks upon them—the more readily, as I may be supposed to be somewhat familiar with that object, though observed with less advantage of optical power.

On comparing the present drawing with my own, made with the four-foot equatorial during my late sojourn at Malta, I find that of the 93 new stars in Lord Oxmantown's list, there are, I believe, only 24 within the more limited area of my drawing. A good many of these have escaped my notice, while, on the other hand, I have detected several which I do not find in the present Catalogue. The following are instances of a few:—Three stars north-preceding No. 119; four stars about the hypotenuse of the nearly right-angled triangle formed by the stars 47, 52, and 53; two stars in the triangle formed by 30, 32, and 35; a delicate point about 20" from 104, with several others. Some of these I have so repeatedly and certainly seen, that I wonder not to find them here. The explanation of this discrepancy may possibly in some instances be found in variability, but must, I think, be rather sought for in the influence which the state of atmosphere has on such delicate objects, when the highest combinations of light and power are brought to bear upon them. As this is a nebula of

great extent, it is possible, and indeed probable, that there may be some spots on which the concentrated attention of any single observer has not been given under the most favourable circumstances. In my own observations, the question of resolvability appeared always an interesting one to settle, and therefore I gave quite as much attention to the detection of stars as to the tracing of the nebula.

The present drawing embracing much more of the extent of this nebula than mine (if not, indeed, the whole of it), I am able to compare mine with it only in part; but, so far as my limits extend, the representations are generally very coincident. In some parts there is a greater *hardness* than I have seen; but it is scarcely possible to convey a *true* impression of the form of the convolutions of the nebula without intensifying them in some degree. I recognized in my own observations more of the spiral or scroll-like character of the nebula about the stars 51 and 57, first pointed out, I believe, by Mr. Bond, than I find in this drawing. In an engraving sent to me by Mr. Bond in 1863, in which photography had, as I understood, been employed, this scroll-like appearance is strongly marked.

On the question of a real change of form of the nebula, no positive conclusion can, I think, as yet be arrived at; but as we have probably now reached much more nearly to the practical limit of optical power in our telescopes, future observations may be expected to be much more comparable with existing drawings than these are with those formerly made.

The evidence of *resolvability* seems to me to be rather on the negative side—my own deductions from what I have seen have been always in that direction; and such of the present observations as apparently look the other way are, I consider, too vague and wanting in precision and certainty, to establish it positively.

[Received April 17, 1868.]

In the account of my observations in Malta with the four-foot equatorial, published in the 36th volume of the Memoirs of the Royal Astronomical Society, there is but a slight reference to the Great Nebula of Orion; the immediate reason for which was, that the drawing I had made was on too large a scale for appearing therein as an engraving, and I was unwilling to subject it to a reduction of size.

Moreover, as Lord Oxmantown's elaborate description and drawings of this incomparable object have recently appeared in the Transactions of the Royal Society, and as the subject may be presumed to be a very interesting one, I beg leave to request of the Society their acceptance of my original drawing (forwarded this day), which contains the sum of all I have been able to make out (both of the details of the nebula and of the stars therein) with the above telescope during my three-years' residence in the Island of Malta.

I also subjoin from my Journal the following few notes relative to some

of the more interesting stars. The fifth star of the trapezium is reddish, and has a pretty broad and not very brilliant disk,—much larger than that of the sixth, which is more brilliant, and whiter. Yet the first impression of the fifth on the eye is more forcible than that of the sixth.

Adopting Herschel's numbers, 57 is much less bright than 51. The star marked II is nearly as bright as 57; but the two stars south-following II are the smallest points visible.

Of the delicate pair preceding δ of the trapezium, the following star is the brightest.

The minute stars preceding and north-following 93, were undoubtedly verified; but there seemed a want of precision in the image of the latter (if one may so speak of such a faint thing) which suggested the idea of its being double.

Herschel's 78, 82, and 91 have on no occasion been recognized; a star, however, has been seen as laid down in the drawing, a very little south-following the place of 78.

In the drawing, Herschel's numbers are adopted throughout; and for convenience of reference and identification, they are attached in minute figures to each star. Its scale, as given at the foot, is $100'' = 1.194$ inch. All the stars which have been certainly and repeatedly seen are inserted, and, I believe, no others. Some attempt at indication of respective magnitude has been made in depicting the stars, but their estimated magnitudes are more precisely given in the margins, right and left of the picture. They are, however, more fully laid down in the following Catalogue of the stars contained in the map, the places being principally taken from Liaponov's measures. A good many of the stars, however, I have independently measured, and though my means for this especial purpose were probably inferior to those of M. Liaponov, I have added a list of my measures for comparison or identification.

W. LASSELL.

Ray Lodge, April 1868.

Catalogue.

L. = Liapouov.

S. = Struve.

LL. = Lassell.

H. = Herschel.

h. 78, 82, 90, 91, and (V.) not seen.

Magni- tude.	Distance from θ .			Designation and Authority for Place.	
12	preceding 1047	171	S.		
9	975	12	N.	h. 5	L.
12.5	943	333	S.		
13	938	408	N.	place un	certain.
8.5	927	676	N.	h. 6	H.
13.5	926	657	S.		
10.5	922	310	S.	h. 8	L.
8	920	823	S.	h. 7	H.
13	906	556	S.		
9	888	816	S.	h. 9	H.
12.5	870	630	S.		
12.5	862	653	S.		
9	849	241	S.	h. 10	L.
12.5	843	439	S.		
9	829	945	S.	h. 11	H.
12	823	461	S.	h. 15	S.
9	769	64	N.	h. 12	L.
12	749	69	S.	h. 13	L.
11	729	73	S.	h. 14	L.
10.5	722	525	S.	h. 16	L.
11.5	718	110	S.		
13	710	518	N.	place un	certain.
13.5	708	494	N.	place un	certain.
10	703	46	S.	h. 17	L.
13	696	634	N.	place un	certain.
14	691	657	N.	?	
9	686	253	S.	h. 18	L.
13.5	671	487	N.	place un	certain.
13.5	654	718	S.		
11.5	647	15	N.	h. 19	L.
11	631	312	S.	h. 21	L.
13.5	626	697	S.		
12	610	538	S.	h. 22	
13	594	768	S.		
13	579	694	S.		
13	567	412	S.		
10	561	786	N.	h. 25	H.
12	549	647	N.	h. 28	H.
10	547	1036	S.	h. 29	H.
9	546	71	S.	h. 27	L.
10	544	208	S.	h. 26	L.
12	531	32	N.	h. 30	L.
12.5	508	178	N.		
8.5	493	289	N.	h. 32	L.
13.5	478	747	N.		
13	477	542	S.		
10.5	466	108	S.	h. 33	L.
13	462	756	N.		
13	462	144	N.	?	
12.5	459	963	S.		
13.5	453	82	S.		
6	432	659	S.	h. 34	L.
12.5	preceding 424	844	S.		

Catalogue (continued).

Magni- tude.	Distance from θ .			Designation and Authority for Place.	
	preceding	"	"		
13.5		400	727	N.	
8.5		398	273	N.	h. 35
12		384	46	S.	h. 36
13.5		382	115	S.	
9		357	592	S.	h. 37
13.5		312	510	N.	h. 39
7.5		311	424	S.	h. 40
10		306	5	N.	h. 38
12		292	498	S.	h. 43
12		290	693	N.	h. 42
12		282	31	S.	h. 41
12		247	16	N.	h. 44
9		243	117	S.	h. 45
13		222	824	N.	
13		221	471	N.	h. 46
13		207	589	S.	
13		206	889	S.	
12		197	400	S.	h. 47
13		184	335	S.	
14		184	805	N.	
9		184	909	N.	I.
13		178	379	S.	
9.5		175	511	N.	h. 48
14		168	303	S.	
6.5		163	666	N.	h. 49
10.5		160	119	S.	h. 50
12.5		159	238	S.	
13.5		116	749	S.	
11.5		107	396	S.	h. 52
14		100	15	S.	
8		95	272	S.	h. 53
13		90	513	S.	?h. 55
12		88	177	S.	h. 54
12.5		85	24	S.	h. 51
11		79	387	N.	h. 56
13.5		75	157	S.	
11.5		65	891	S.	?h. 58
13.5		57	511	S.	
13.5		57	23	S.	h. 57
? 13.5		55	434	S.	
13		49	786	S.	
11.5		37	453	S.	h. 62
10.5		34	966	S.	h. 59
12		34	769	S.	h. 60
13		26	993	S.	
12		22	947	S.	
14		17	18	N.	
14		12	19	N.	
11		10	12	N.	h. 64=E.
12		9	949	S.	h. 63
7		9	8	N.	h. 65=A.
13.5		9	504	N.	h. 66
12.5		7	28	S.	II.
8		5	16	N.	h. 67=B.
14		0	35	S.	? nebulous patch.
4.5	preceding	0	0		h. 69=C.
11.5	following	3	2	S.	h. 71=F.

Catalogue (continued).

Magni- tude.	Distance from θ .				Designation and Authority for Place.	
9.5	following	"	"	S.	h. 74	L.
9.5		3	953	N.	h. 70	L.
14		6	98	S.		
13.5		7	10	N.	III.	S.
14.5		8	107	N.	?	
6		11	47	N.	h. 73=D.	L.
14		12	7	N.		
.....		16	596	S.	?	
13.5		19	8	S.		
13		20	575	S.		
12.5		21	968	S.		
11		21	39	N.	h. 75	S.
13.5		25	407	N.	h. 79	L.
11.5		28	48	N.		
11.5		30	172	N.	h. 76	L.
11.5		34	433	N.	h. 83	L.
12		36	165	N.	h. 80	L.
12.5		54	146	N.	h. 84	L.
13		57	196	S.	? h. 81	S.
8.5		58	856	S.		
9		61	851	N.	h. 85	L.
9.5		62	100	N.	h. 87	L.
12		63	674	N.	h. 86	L.
13.5		69	24	S.	h. 88	L.
14		70	200	S.		
11		74	430	S.	?	
13.5		74	854	N.		
14		76	467	S.		
13.5		77	96	S.		
12		78	27	S.		
14		81	173	N.	h. 89	L.
5		88	109	S.	?	
12		98	94	S.	h. 93	L.
13		102	673	S.	h. 92	H.
10		102	742	N.		
14		117	442	S.	h. 95	L.
13		117	79	S.		
12		122	743	N.	h. 94	
13		126	814	N.	h. 97	
13.5		139	734	N.	h. 96	
10		140	427	S.		
10		142	494	N.	h. 102	L.
10.5		146	612	N.	h. 99	
11		146	884	N.	h. 98	
10.5		149	134	S.	h. 100	L.
6		149	251	S.	h. 103	L.
14		150	96	S.	h. 101	L.
14		160	782	N.		
14.5		170	185	S.		
8.5		178	95	S.		
12		181	174	S.	h. 104	L.
11.5		185	693	S.	h. 105	H.
11		202	824	N.	h. 107	H.
14.5		208	567	S.	h. 106	L.
14		209	130	S.		
13		212	59	S.		
5.5	following	214	273	N.	h. 109	L.
		217	445	N.	h. 108	L.

Catalogue (continued).

Magni- tude.	Distance from θ .			Designation and Authority for Place.	
		"	n-l.		
12.5				h. 108	
14.5	following	223	427	only seen	24th Nov. 1864
7.5		225	110	h. 110	L.
8		230	582	h. 111	L.
		237	161	? nebulous knot	
13.5		242	340		
10.5		244	465	h. 112	L.
13.5		246	406		
12.5		272	870	?	
14		280	474		
8		281	669	h. 113	L.
14.5		285	460		
13.5		286	345		
12.5		299	129	h. 114	H.
14		312	650	?	
13		313	850	? h. 115	
13.5		316	878		
12		319	184	IV.	Ll.
13.5		340	882		
13.5	following	344	366	h. 116	
13.5	var.	359	243		
12.5		360	624		
11.5		362	213	h. 117	L.
12	var.	369	691	h. 118	H.
11	following	369	846	h. 119	H.
9.5		370	196	h. 120	
10		385	284	h. 123	L.
12.5		385	742	h. 122	H.
9.5		387	588	h. 124	L.
11.5		409	778	h. 125	L.
13		417	182		
		417	669	?	
10.5		417	753		H.
11		418	514	h. 126	L.
13		437	617		
12.5		453	334	h. 128	S.
10		459	393	h. 129	L.
13		504	714	h. 131	
10		505	1015	h. 132	H.
8		511	303	h. 133	L.
12		514	418	h. 130	
13		518	499		
13		532	319	h. 134	H.
13.5	following	563	185		
6	dup.	574	851	h. 135	L.
14.5		593	33	?	
13.5		597	96		
7.5		628	64	h. 136	L.
10		641	984	h. 138	H.
14		656	25		
12		666	364	h. 137	Ll.
12		784	267	h. 141	H.
10.5		797	254	h. 142	L.
14		877	831		
5.5	following	889	916	h. 143	L.

Remeasurement of some of the Stars of the above Catalogue.

Stars South of θ Orionis.				Stars South (<i>continued</i>).					
h.	17	preceding	702.7	42.8	h.	54	preceding	85.7	175.1
	18		683.7	244.1		62		39	449.3
	26		536.2	207.6		88	following	66.7	24.4
	27		543.3	71.8		91		112.8	53.8
	33		463.3	113.6		93		96.3	93.2
	36		382.7	50.6		95		113.9	440.5
	37		355.3	583.3		103		150.1	248.1
	40		317.2	420.9		101		151.5	97.2
	41		270.6	36		104		178.7	170.5
	43		290.5	483.4		111		227.1	579.1
	45		241.8	117.9		112		239.6	457
	47		192.6	397.8		117		359.5	213.2
	50		163.6	116.7		123		380.4	284.4
	52		105.5	398.3		126		412.6	503.5
	53		91.4	273.1		133		507.1	301.7
	51	preceding	84.2	21.8		142	following	783.6	254.9

Stars North of θ Orionis.				Stars North (<i>continued</i>).					
h.	12	preceding	776.8	70.5	h.	86	following	63.4	669.0
	19		639.9	10.2		87		61.1	99.8
	32		492.8	286.4		99		148.8	611.2
	35		400.2	270.4		102		144.6	488.0
	38		304.0	0.0		109		214.4	272.8
	44		246.8	8.6		108		210.7	440.3
	48		172.9	502.1		113		277.7	658.9
	49		161.2	663.9		120		367.3	195.3
	56	preceding	86.1	380.4		124		384.8	584.7
	70	following	9.0	96.6		129		459.0	387.9
	75		24.1	41.5		136		625.5	65.7
	76		32.2	166.3		137	following	666.1	363.9
	79	following	21.0	400.4					

April 30, 1868.

Lieut.-General SABINE, President, in the Chair.

The following communications were read:—

- I. "Observations on the Development of the Semilunar Valves of the Aorta and Pulmonary Artery of the Heart of the Chick."
By MORRIS TONGE, M.A., M.D. Communicated by Dr. BEALE.
Received March 24, 1868.

(Abstract.)

Kölliker is the only embryological author in whom I have found any information about the development of the semilunar valves of the aorta and